Dart Aerospace Ltd.

Date: Monday, 3/13/2006 7:31:18 AM
User: Kim Johnston

Process Sheet

Customer	: CU-DAR001 Dart Helicopters Services	**Drawing Name**	: SLIDE BAR
Job Number	: 26219		
Estimate Number	: 11085		
P.O. Number	: N/A	**Part Number**	: D30111
This Issue	: 3/13/2006 **S.O. No.** : N/A	**Drawing Number**	: D3011 REV A
Prsht Rev.	: NC	**Project Number**	: N/A
First Issue	: N/A **Type** : MACHINED PARTS	**Drawing Revision**	: A
Previous Run	: N/A	**Material**	: N/A
Written By	: SEE COMMENT BELOW	**Due Date**	: 3/30/2006 **Qty:** 5 **Um:** Each
Checked & Approved By	: 06.03.13		
Comment	: Est. C 02.05.09 Added D6202 at step 2 NG		

Additional Product

Job Number:

Seq. #:	Machine Or Operation:	Description :
1.0	D6202	I Beam Extrusion

Comment: Qty.: 1.0000 f(s)/Unit Total : 5.0000 f(s)
I Beam Extrusion
Material: 6061-T6 (QQ-A-200/8)
'I' Beam Extrusion 4" x 2.796" x 0.326" Batch 14742 J-F 06/04/05

2.0	BAND SAW	BAND SAW

Comment: BAND SAW
Cut Blanks: 26.57" JF 06/04/05

3.0	HAAS1	HAAS CNC VERTICAL MACHINING #1

Comment: HAAS CNC VERTICAL MACHINING #1
Ensure Batch Number programmed matches this W/O
Machine as per folio FA129 JF / JL 06.04.07

4.0	QC2	INSPECT PARTS AS THEY COME OFF MACHINE

Comment: INSPECT PARTS AS THEY COME OFF MACHINE / JL 06.04.07

5.0	SMALL FAB 1	SMALL & MEDIUM FAB RESOURCE 1

Comment: SMALL & MEDIUM FAB RESOURCE 1
Deburr JL 06.04.07

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes (No) **DQA:** ☑ **Date:** 06/04/19

QA: N/C Closed: _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			
06/04/05	3	Not the good batch# B# wasn't changed in program and ran previous B# (B17089)	GP	check the batch number in the program before machining the piece. Type new B# Scrap, destroy & replace.	J-F 06/04/05	06.04.05	GP	06.04.05
06.04.06	3	Dimension 2.125 is 2.097 Dim 2.500 is 2.465 see attached email and diagrams	GP 06.04.06 per QS1042	PART IS OK PER ATTACHED ANALYSIS AND EMAIL	J.L 06.04.06	06.04.11	GP 06.04.06 per QS1042	06.04.11

NOTE: Date & initial all entries

Date: Monday, 3/13/2006 7:31:18 AM
er: Kim Johnston

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services **Drawing Name:** SLIDE BAR

Job Number: 26219 **Part Number:** D30111

Job Number:

Seq. #:	Machine Or Operation:	Description :
6.0	HAND FINISHING1	HAND FINISHING RESOURCE #1

Comment: HAND FINISHING RESOURCE #1
Acid etch and Alodine as per QSI 005 4.1 a.m 06-04-17 (5)

7.0	POWDER COATING	POWDER COATING

Comment: POWDER COATING
Powder Coat White Gloss (Ref: 4.3.5.1) as per QSI 005 4.3 a.m 06-04-17 (5)

8.0	QC3	INSPECT POWDER COAT/CHEMICAL CONVERSION

Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION DL 06/04/17 (5)

9.0	PACKAGING 1	PACKAGING RESOURCE #1

Comment: PACKAGING RESOURCE #1
Identify and Stock
Location: ST 116 6/4/18 5

10.0	DC	DOCUMENT CONTROL

Comment: DOCUMENT CONTROL
Inspection Level 21 06/04/19 (5)

Job Completion 06.04.19

Dart Aerospace Ltd

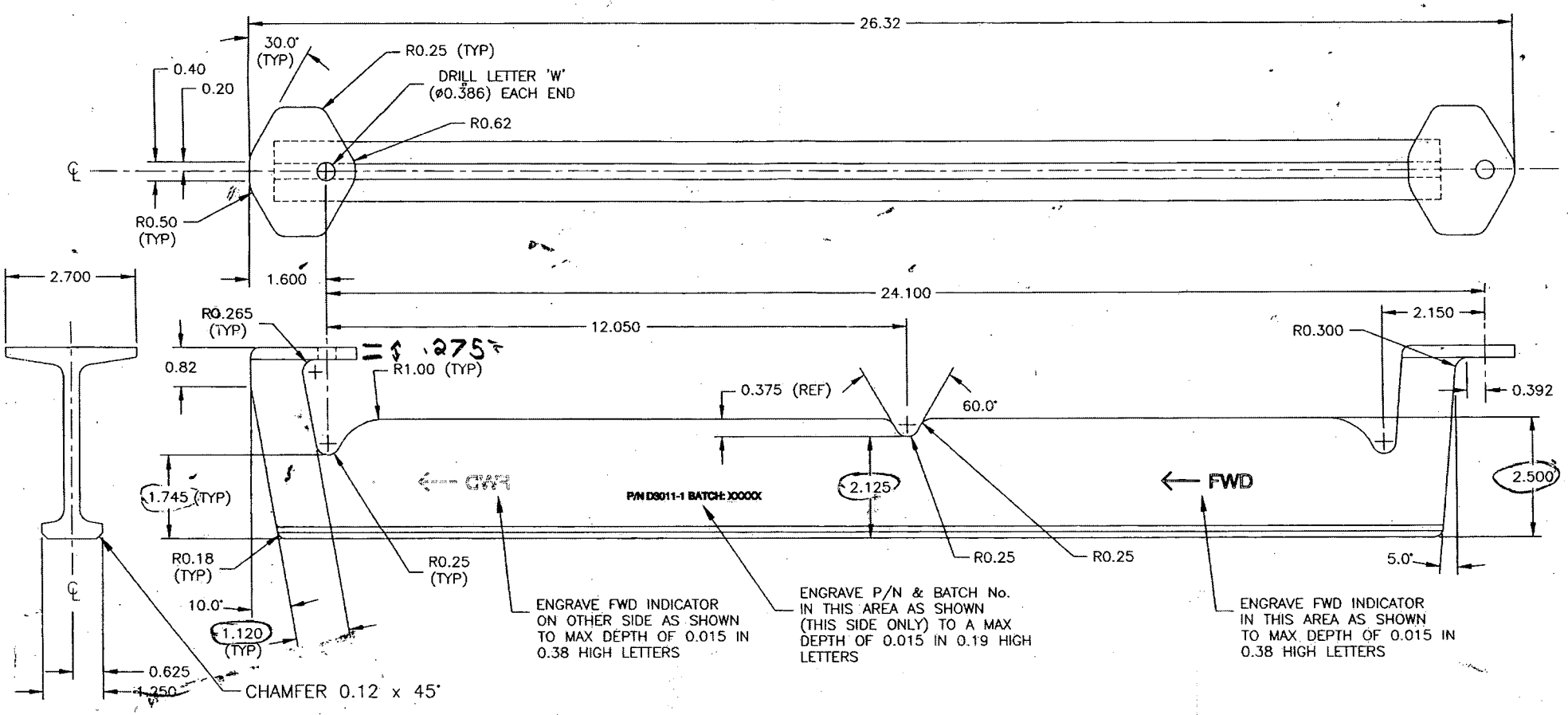
W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

QA: N/C Closed: _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries



RELEASED
01.04.09

QA COPY ISSUED

D3011-1
MANUFACTURE FROM D6202-027 EXTRUSION
BREAK ALL SHARP EDGES 0.010-0.020
FINISH: ACID ETCH AND ALODINE PER DART QSI 005 4.1
POWDER COAT WHITE (4.3.5.1) PER DART QSI 005 4.3
TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
ALL DIMENSIONS ARE IN INCHES

A		01.03.29	NEW ISSUE
DESIGN	DRAWN BY	DART	DART AEROSPACE LTD. HAWKESBURY, ONTARIO, CANADA
CHECKED	APPROVED	DRAWING NO.	REV. A
		D3011	SHEET 1 OF 1
DATE		TITLE	SCALE
01.03.29		RAPPEL SLIDE BAR	1:2

Chris Provencal

From: David Shepherd [davids@dartaero.com]
Sent: April 6, 2006 2:15 PM
To: Chris Provencal
Subject: Re: ncr D3011-1

Chris,

I have reviewed the analysis you sent by fax and I agree that the parts mentioned below are an acceptable deviation. Please attach a copy of the analysis and this email to the work order.

Thanks,
David

----- Original Message -----
From: "Chris Provencal" <cprovencal@dartaero.com>
To: <davids@dartaero.com>
Sent: Thursday, April 06, 2006 11:55 AM
Subject: ncr D3011-1

>
> Dave,
>
> The D3011-1 Rappel Slide Bar. The dimension 2.125" on the dwg is 2.097, and
> the height 2.500" is 2.465" at its minimum. I did a calculation based on
> SUB2-D205-523 Rev. A page 2, and the margin is still positive. I will fax
> you that calculation, which I did on the photocopied page 2 of the
> aforementioned document.
>
> Is this acceptable?
>
> Sincerely,
> Chris Provencal
> DART Aerospace Ltd.
> Email..cprovencal@dartaero.com
> Phone...613-632-3336
> Fax.....613-632-4443
>
>

FROM PAGE 18 OF SR205-523, THE ROOF HARDPOINT @ STA 105.1 IS RATED FOR 1500 LB ULTIMATE LOAD.

$\therefore P = (317\ LB)(2.5)(1.5) = 1189\ LB$

$MS = \frac{1500\ LB}{1189\ LB} - 1 = \underline{0.26} \longleftarrow OK$

4.0 D2224 ANCHOR ANALYSIS

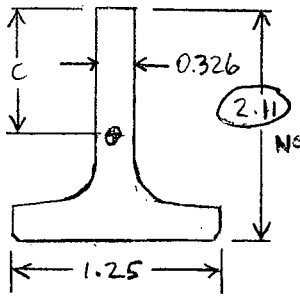
PER SUB1-D205-523 REV. A, THE D2224 ANCHOR WAS SUBSTANTIATED FOR A FACTORED LOAD OF 1294 LB FOR THE D205-523-011 INSTALLATION. IN THE CASE OF THE D205-523-013 INSTALLATION, THE ANCHOR MUST BE SUBSTANTIATED FOR $F = (600\ LB)(2.5)(1.5) = 2250\ LB$. IF $F = 2250\ LB$, THE MARGINS IN SUB1-D205-523 GET RE-CALCULATED AS FOLLOWS:

MS1 = 0.11
MS2 = 20.4
MS3 = 3.7
MS4 = 3.5

} ALL POSITIVE, ALL OK

5.0 D3011-1 SLIDE BAR ANALYSIS

IN COMPARISON TO THE D1005 SLIDE BAR, THE D3011-1 SLIDE BAR HAS AN INCREASED SECTION TO HANDLE A 500LB WORKING LOAD AT POINT B.



$F_{tu} = 38\ ksi\ (QQ\text{-}A\text{-}200/8)$

$c = 1.33"$, $I = 0.42\ in^4$ } FROM AUTOCAD

$c = 1.33"$ (AutoCAD)
$I = 0.416\ in^4$ (AutoCAD)

$P = (500\ lb)(2.5)(1.5) = \underline{1875\ lb}$ $P = 1875\ lb$

$M = \frac{PL}{4} = \frac{(1875\ lb)(24.10")}{4} = \underline{11297\ lb\cdot in}$ $M = 11297\ lb\cdot in$

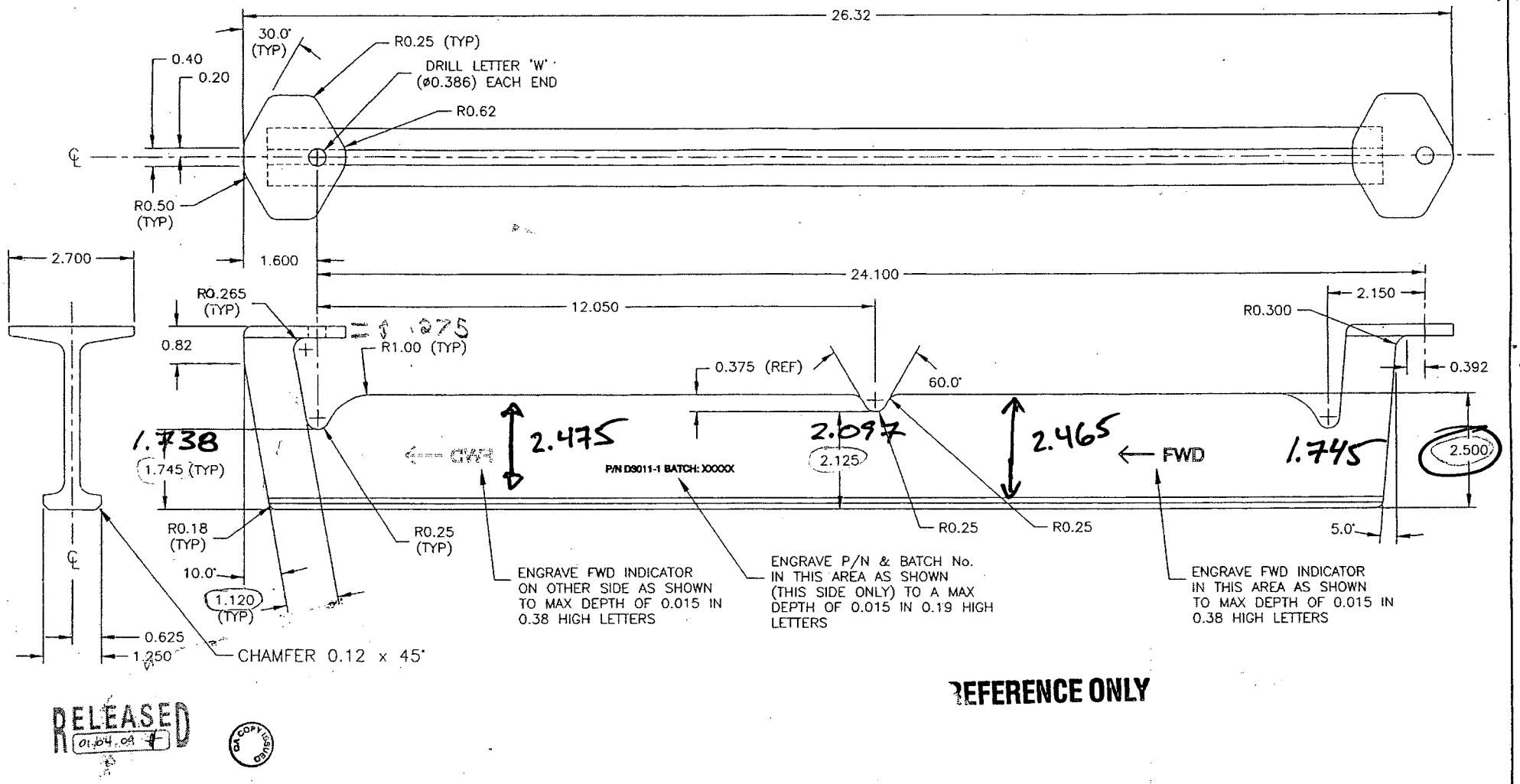
$\sigma_{cr} = \frac{Mc}{I} = \frac{(11297\ lb\cdot in)(1.33")}{0.42\ in^4} = 35.8\ ksi$ $\sigma = \frac{11297 \cdot 1.33}{0.416} = 36118$

$MS = \frac{F_{tu}}{\sigma_{cr}} - 1 = \frac{38\ ksi}{35.8\ ksi} - 1 = \underline{0.06} \longleftarrow OK$

$MS = \frac{38}{36.1} - 1 = 0.05$

OK

06.04.06



REFERENCE ONLY

RELEASED
01.04.09

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CHECKED	APPROVED	DRAWING NO.	REV. A
DATE		D3011	SHEET 1 OF 1
01.03.29		TITLE	SCALE
		RAPPEL SLIDE BAR	1:2

DART AEROSPACE LTD	Work Order:	26219
Description: Slide bar	Part Number:	D3011-1
Inspection Dwg: D3011 Rev: A		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

[X] First Article [ ] Prototype

Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
.275	± .010	.274	✓			
1.745	"	1.750	✓			
1.120	"	1.120	✓			
2.125	"	2.122	✓			
2.500	"	2.495	✓			
.375	"	.365	✓			
1.250	"	1.250	✓			
Ø.386	+.006 -.002	.390	✓			
26.32	± .030	26.32	✓		m.tape	
2.700	± .010	2.710	✓			
1.600	± .010	1.600	✓			
.275	"	.273	✓			
24.100	"	24.100	✓		m.tape	

Measured by:	J.L	Audited by:	MB	Prototype Approval:	
Date:	06.04.06	Date:	06/04/07	Date:	

Rev	Date	Change	Revised by	Approved
A		New Issue	KJ/RF	